

THE FERNS OF STEERE AND HARRINGTON

Michael G. Price

Division of Biological Sciences and Herbarium

The University of Michigan

Ann Arbor, Michigan 48109

In 1870, soon after graduating from the University of Michigan, Joseph Beal Steere (1842–1940) began a more than five year expedition around the world. Despite traveling mostly alone, often experiencing great hardship, and frequently being exposed to grave peril, his accomplishments in natural science on this expedition were so extraordinary that he was awarded an honorary Ph.D. by the University of Michigan even before his return to Ann Arbor. It was the first degree of this kind granted by the University. Although Steere made other scientific trips and went on to a notable career as Professor of Zoology, specializing in Ornithology, and was also curator of the University Museum from 1876 to 1894,¹ he remains best known for the explorations, research, and natural history collections made from 1870 to 1875 (Gaige, 1932).

Steere obtained botanical materials from Brazil, Peru, Ecuador, China (including Taiwan and Hong Kong), the Philippines, and what is now part of Indonesia (the Moluccas). His collections, made without numbers, were divided into over 2,500 specimens (Harrington, 1875), virtually all of which were pteridophytes; these were later treated as consisting of 241 taxa (Harrington, 1877). For his entire natural history collection, Steere eventually received \$4,500 from the University of Michigan, along with an agreement to his stipulation that the material be forever known as the “Beal and Steere Collection” (Steere, 1879).

Although Steere’s mother was a Beal, and he was a first cousin of the accomplished Michigan botanist William James Beal,² the reason for the inclusion of the name Beal was that the expedition was financed by Rice A. Beal, a wealthy relative and the publisher of the Ann Arbor “Courier,” a weekly newspaper. In return for this aid, Steere authored 96 letters for publication in the newspaper, periodically reporting on his experiences and observations. These well-composed and information-filled letters conferred upon Steere a modicum of fame; selected letters were republished shortly before his death (Steere 1938a, 1938b).

During Steere’s absence, a close friend and fellow graduate from the Class of 1868, Mark Walrod Harrington (1848–1926), rose to the position of Assistant Professor, with botany his main interest, and it befell Harrington to identify the botanical specimens, nearly all ferns, received from the expedition. It is plausible that the numerous fern specimens were secured by Steere as a special favor to Harrington, who had already been working with ferns, and whose list of 200 fern species in the University of Michigan herbarium (previous to the Steere

¹Steere’s resignation and early retirement, in 1894, resulted from what was considered a too forceful advocacy of prohibition (Crum, 1977).

²Another notable botanist in the immediate family is the bryologist William Campbell Steere, grandson to J. B. Steere.

collections) was published by the Board of Regents (Harrington, 1875). When he traveled to Germany in 1876, Harrington brought the Steere ferns with him, and identified them during a side-trip to the Royal Botanic Gardens, Kew, England, with help from J. G. Baker, the resident pteridologist. The study resulted in the first substantial botanical paper associated with the University of Michigan (Harrington, 1877), and in the election of Harrington as a Fellow of the Linnean Society of London.

But Harrington soon switched fields, and by the time he returned to Ann Arbor in 1879, he had spent two years in Peking as an astronomer. He headed the Astronomy Observatory at the University of Michigan until 1891, when he moved on to be the first chief of the United States Weather Bureau. In 1895 he accepted the post of President at the University of Washington, which he held for only one year. In 1899, soon after the publication of his book *All About Weather*, Harrington suddenly disappeared; when finally located he was suffering from partial amnesia. The last 27 years of his life were spent wandering as a hobo, working as a logger and day laborer, and as a patient in a mental institution (Jones, 1978; Baker-Blocker, 1980).

Harrington presumably transported the entire fern collection to Kew (K) in 1876 for his study. After naming it, he left a duplicate set for Kew and shipped the remainder, unaccompanied, back to Ann Arbor (MICH), from where further duplicates were distributed to at least five institutions: Field Museum (F), Harvard University (GH), Missouri Botanical Garden (MO), Smithsonian Institution (US) and Yale University (YU). Very probably the task of distributing the duplicates was assumed by Elizabeth C. Allmendinger, author of an enumeration of the flora of the Ann Arbor area, a friend of Harrington, and a volunteer assistant in the University of Michigan herbarium. As partial compensation for her volunteer work she was allowed to select duplicate specimens for her own personal herbarium (Voss, 1978); she made herself an incomplete set of fragments of the Steere ferns. The Allmendinger herbarium was donated to MICH by her estate in 1928. An additional set of fragments was detached from the MICH specimens in 1907 and sent to E. B. Copeland in the Philippines, forming the basis of two published papers (Copeland 1908; 1936). These fragments were returned in 1958 when Copeland's herbarium of about 25,000 sheets was purchased by the University of Michigan for \$16,000. Thus MICH now possesses three sets: the original and by far the most ample set, and partial sets from Allmendinger and Copeland.

From Steere's pteridophyte collections, Harrington³ described as new nineteen ferns, fifteen species and four varieties; of these, eleven were from the Philippines and four each from Taiwan and Peru. One problem arising from these has been uncertainty as to whether specimens at K or specimens at MICH should be designated lectotypes. Since Harrington apparently had all the specimens with him when he wrote his descriptions and since none of the collections of the new taxa seem to be mixtures, the problem is mainly of formal technical significance. Nevertheless, the type system requires that a designation be made. Although Harrington certainly decided which taxa to describe as new while he was at K and published in a British journal, it is my opinion that all the lectotypes (with one exception, *Adiantum steerei* Harr.) should be the MICH specimens, and in this paper I make that designation. The specimens at K are therefore isolectotypes.

Of the arguments in favor of MICH, the first is that MICH was the home institution for both Steere and Harrington, and the specimens selected by an author for his home institution should generally be given preference.

³No one after Harrington has made a J. B. Steere plant a type.

Secondly, information about some of the K specimens of the type collections, kindly supplied by Dr. R. E. Holttum, reveals that those at MICH are superior by being generally more ample or useful; we can be virtually certain that Harrington returned to MICH what he considered to be the best specimens. For example *Nephrodium subpedatum* Harr. was described from only two fronds, of which just one was said to be fruiting, i.e., fertile. The fertile frond is at MICH.

Thirdly, and again with the help of Dr. Holttum, I have ascertained that the K sheets have less detailed annotations than the MICH specimens,⁴ and do not have the original field notes. Rather, in at least one case, that of *Lomaria areolaris* Harr., the K sheet fails to provide any indication of the very unusual habitat, which is written on the MICH sheet in Harrington's hand and also appears with the published description.

A fourth consideration is that the MICH specimens of Steere's collections are named directly on the sheets in Harrington's hand and Steere's field notes were rewritten by Harrington either directly on the sheets or on mechanically reproduced handwritten labels.⁵ This raises the possibility that the information may have been written by Harrington before leaving MICH or while at K, which might then indicate that he had pre-selected the Michigan sheets, although he did retain an interest in botany after turning professionally to astronomy,⁶ and did some herbarium work after 1879 (Mains, 1956).

Finally, according to Steenis-Kruseman (1950, p. 504), only 170 Steere ferns were acquired by K. If this number is accurate, it would confirm the fact that the K set is quite incomplete and certainly not the best set.

In the following re-evaluation of the Harrington types, I have provided the original citation, all nomenclatural synonyms, and the name(s) accepted by current authors. Two of the ferns have until now been generally misinterpreted: *Nephrodium subpedatum* Harr. and *Polypodium steerei* Harr. I have also given the fullest possible information of locality and date, in some cases obtained from the manuscript of Hubbell (1964) who reconstructed the itinerary from Steere's letters. The sequence of ferns in Harrington's publication, placing the New World collections last even though made first, otherwise followed that of *Synopsis Filicum* (Hooker & Baker, 1868); that same sequence is followed here.

THE NEW TAXA

Hymenophyllum thuidium Harr., J. Linn. Soc. Bot. 16: 25. 1877; Copel. Philip. J. Sci. 64: 116, pl. 56. 1937.

Mecodium thuidium (Harr.) Copel., Philip. J. Sci. 67: 20. 1938.

Lectotype: Philippines, Panay, Iloilo Prov., mountains above Maasin, Jan. 1875, Steere s.n. (MICH).

Currently accepted names: *Hymenophyllum thuidium*; *Mecodium thuidium*; *H. reinwardtii* v.d.B.; *M. reinwardtii* (v.d.B.) Copel.

The type of *H. thuidium* is at one extreme of variation of the plants associated with *H. reinwardtii*, differing from the latter species as narrowly construed by the much more pronounced and finer crusting of the lamina, narrower and more crowded segments and smaller stature, but certainly not clearly distinct.

This was grouped by Morton (1968, p. 167, 172) with the species treated as *Meringium* by Copeland on the basis of the toothed margins, but the indusial

⁴Although one K specimen, that of *Gymnogramma calomelanos* var. *denudata* Harr., bears a locality not on the MICH sheet.

⁵For a sample of Harrington's early writing, see McVaugh (1970, p. 220).

⁶While in China, Harrington himself collected a few plants, including at least one fern, *Cheilanthes argentea* (Gmel.) Kunze, which came to MICH in 1928 with the Allmendinger herbarium.

structure and the form of the receptacle show an unmistakable affinity to *Mecodium*.

Hymenophyllum fraternum Harr., J. Linn. Soc. Bot. 16: 26. 1877 (non Presl 1843).

H. steerei C.Chr., Ind. Fil. 368. 1905.

Lectotype: Philippines, Panay, Iloilo Prov., mountains above Maasin, Jan. 1875, *Steere s.n.* (MICH).

Currently accepted names: *Hymenophyllum fimbriatum* J.Sm. ex Hook.; *Mecodium fimbriatum* (J.Sm. ex Hook.) Copel.

According to Harrington this was found growing with the preceding, and there was only a single plant. The lectotype (or holotype if no other separate specimen was originally made) has a length of rhizome with only a single frond, from which a single pinna that had been detached for study by Copeland is now mounted on a separate sheet.

Davallia philippinensis Harr., J. Linn. Soc. Bot. 16: 27. 1877.

Microlepia philippinensis (Harr.) Copel., Polyp. Philip. 56. 1905.

Tapeinidium philippinense (Harr.) C.Chr., Ind. Fil. Suppl. 3: 176. 1934.

Lectotype: Philippines, Luzon, Mt Mahayhay (= Mt Banahaw), June–July 1874, *Steere s.n.* (MICH).

Currently accepted name: *Tapeinidium luzonicum* (Hook.) Kramer.

Having not seen the sheet at MICH, which had been misfiled, Kramer (1968, p. 552) was only able to cite the specimen at K, although not explicitly as lectotype.

Lomaria areolaris Harr., J. Linn. Soc. Bot. 16: 28. 1877.

Blechnum areolare (Harr.) Copel., Polyp. Philip. 90. 1905.

Stenochlaena areolaris (Harr.) Copel., Philip. J. Sci. 2C: 406. 1908.

Lectotype: Philippines, Luzon, Mt Mahayhay (= Mt Banahaw), growing in the leaves of a *Pandanus*, June–July 1874, *Steere s.n.* (MICH).

Currently accepted name: *Stenochlaena areolaris*.

This is the most unusual of the ferns collected by Steere, and it is also rather strange that his collection of it was the first, since the same area had been previously combed for ferns by, among others, Cuming and Brackenridge. The fern is a scandent epiphytic aquatic, rooting in and clambering between the water-filled leaf bases of *Pandanus simplex* Merrill, which is common in the area and even cultivated. The pandan is the mainstay of an important cottage industry, its long leathery leaves being woven into mats, baskets, hats and other articles. The leaf bases contain a substantial amount of water and harbor an interesting fauna, including small crabs. Plant-held waters were termed phytotelmata by Maguire (1971), although *Pandanus* was not mentioned. My observations are that prothallia only develop in leaf pockets not already inhabited by the *Stenochlaena*, possibly indicative of allelopathy. The tips of the rhizoids of prothallia develop into branched and expanded holdfasts anchored to the sides of the pocket that may function to help prevent the gametophytes from being flooded out in the frequent heavy rainstorms such as characterize the vicinity of Mt Banahaw.

Asplenium steerei Harr., J. Linn. Soc. Bot. 16: 28. 1877.

Lectotype: Philippines, Luzon, Mt Mahayhay (= Mt Banahaw), epiphytic on trunks, June–July 1874, *Steere s.n.* (MICH).

Currently accepted name: *Asplenium steerei*.

While reducing *Asplenium benguetense* Hieron. to *A. steerei*, Price (1974a) suggested that *A. steerei* might in turn have to be reduced to one of three earlier

names: *A. acutiusculum* Bl., *A. anisodontum* Presl, or *A. insiticium* Brack. That idea is now withdrawn.

Asplenium acutiusculum Bl. Enum. Pl. Jav. 178. 1828 (Holotype: Java, *Blume s.n.*, L sheet no. 908,311–892) is a smaller individual of the same species as *A. longissimum* Bl. published on the same page (Holotype: Borneo, collector unknown, L sheet no. 922, 167–1020). I here designate *A. longissimum* the accepted name for the species when the two names are combined. For a modern description of the species, see Holttum (1955).

The Philippine *Asplenium anisodontum* Presl based on *Cuming 128* is a member of the complex of *A. caudatum* Forst.; the Hawaiian *A. insiticium* Brack. seems to be a large elaborate form of *A. contiguum* Kaulf. None of these are closely related to *A. steerei*.

Nephrodium luerssenii Harr., J. Linn. Soc. Bot. 16: 29. 1877.

Aspidium luerssenii (Harr.) Christ, Bull. Herb. Boiss. 6: 193. 1898 (non Doerfler, 1890).

Dryopteris luerssenii (Harr.) C.Chr., Ind. Fil. 276. 1905.

Lectotype: Philippines, "Bulukai Island," 1874, *Steere s.n.* (MICH).

Currently accepted names: *Thelypteris ligulata* (Presl) Ching; *Pneumatopteris ligulata* (Presl) Holtt.

Harrington localized this as from "Bulukai Island," and the labels on sheets I have seen read "Bulukai, Luzon," and "Buluka Island, Luzon," but there was and is no such place name. I am convinced that Bulukai Island is a misrendering of Balabac Island from Steere's original field label, long discarded. There is also another possibility. On 23 June 1874, on the first day of his journey on foot from Mahayhay to Mauban, Luzon, Steere reached the "village of Bulukon" and could have found this plant in that vicinity. I agree with the supposition of Hubbell (1964) that "Bulukon" in that case must have been the town of Lucban.

Unable to examine the MICH specimen, which had been misfiled, Holttum (1974a; 1982) cited only a K specimen, but not specifically as lectotype.

Nephrodium eatonii var. **formosanum** Harr., J. Linn. Soc. Bot. 16: 29. 1877.

Lectotype: Taiwan, Keelung, March 1874, *Steere s.n.* (MICH).

Currently accepted name: *Ctenitis eatonii* (Bak.) Ching.

Nephrodium bakeri Harr., J. Linn. Soc. Bot. 16: 29. 1877; Bak. in J. D. Hook. Icon. Plant. 17: pl. 1664. 1886.

Dryopteris bakeri (Harr.) Copel., Philip. J. Sci. 2C: 405. 1907.

Haplodictyum bakeri (Harr.) Ching, Sunyatsenia 5: 251. 1940; Holtt. Kalikasan 2: 63. 1974.

Cyclosorus bakeri (Harr.) Copel., Gen. Fil. 142. 1947.

Thelypteris bakeri (Harr.) Reed, Phytologia 17: 262. 1968.

Pronephrium bakeri (Harr.) Holtt., Fl. Males. II, 1: 516. 1982.

Lectotype: Philippines, Panay, Iloilo Prov., mountains above Maasin, Jan. 1875, *Steere s.n.* (MICH).

Currently accepted names: *Thelypteris bakeri*; *Haplodictyum bakeri*; *Pronephrium bakeri*.

Haplodictyum, when recognized as a genus, consists of four species, all endemic to the Philippines (Holttum, 1974b).

Nephrodium subpedatum Harr., J. Linn. Soc. Bot. 16: 30. 1877.

Aspidium subpedatum (Harr.) Diels, Natur. Pflanzenfam. 1(4): 186. 1899.

Tectaria subpedata (Harr.) Ching, Sinensia 2: 23, t.4. 1931.

Lectotype: Taiwan, E. of Takao (= Kaohsiung), March 1874, *Steere s.n.* (MICH).

Currently accepted name: *Tectaria polymorpha* (Wall. ex Hook.) Copel.

Ching (1931, p. 23) published a photo of the "type" but, instead of a Steere specimen, it is the type of a name that is based on a later Morse collection from the China mainland and that Ching assumed to be synonymous. In Flora of Taiwan (DeVol et al. 1975), this species will key out to *Tectaria trifolia*, a synonym of *T. angulata* (Willd.) Copel. However, I have seen no specimens referable to *T. angulata* from Taiwan and I believe that all so named are *T. polymorpha*; for the distinctions, see Price (1974b, p. 45).

Harrington noted that only one of the two fronds collected was fertile, and it is the fertile frond that is present at MICH, thus supporting the choice of the MICH specimens as lectotypes of the Harrington names, rather than those of K.

Polypodium aoristorum Harr., J. Linn. Soc. Bot. 16: 30. 1877.

Nephrodium aoristorum (Harr.) Copel, Polyp. Philip. 28. 1905.

Dryopteris aoristora (Harr.) C.Chr., Ind. Fil. 252. 1905.

Cyclosorus aoristorum (Harr.) Copel., Gen. Fil. 142. 1947.

Thelypteris aoristora (Harr.) Reed, Phytologia 17: 260. 1968.

Nannothelypteris aoristora (Harr.) Holtt., Blumea 19: 38. 1971; Kalikasan 2: 65. 1974; Fl. Males. II, 1: 538. 1982.

Lectotype: Philippines, Panay, Iloilo Prov., mountains above Maasin, Jan. 1875, Steere s.n. (MICH).

Currently accepted names: *Thelypteris aoristora*; *Nannothelypteris aoristora*.

This species provides the type of the generic name *Nannothelypteris*, which, like *Haplodictyum* (see *Nephrodium bakeri* above), applies to several diminutive species endemic to the Philippines (Holttum, 1974b).

Polypodium schenkii Harr., J. Linn. Soc. Bot. 16: 31. 1877.

Lectotype: Philippines, Panay, Iloilo Prov., mountains above Maasin, Jan. 1875, Steere s.n. (MICH).

Currently accepted names: *Ctenopteris obliquata* (Bl.) Copel.; *Prosaptia obliquata* (Bl.) Price, infra.

The types of *Ctenopteris*, *Cryptosorus*, and *Prosaptia* all belong to a natural species-group of Grammitidaceae characterized by pinnatifid or just pinnate fronds, with sori impressed or sunken into the lamina, and with rhizome paleae clathrate and ciliate. The earliest generic name for these is *Prosaptia*, and thus *Ctenopteris* as a genus name cannot stand despite its current wide use. The proper combination for this species is: **Prosaptia obliquata** (Bl.) Price, *comb. nov.* (basionym: *Polypodium obliquatum* Bl. Enum. Pl. Javae 129. 1828).

Polypodium craterisorum Harr., J. Linn. Soc. Bot. 16: 31. 1877.

Lectotype: Philippines, Luzon, Mt Mahayhay (= Mt Banahaw), June–July 1874, Steere s.n. (MICH).

Currently accepted names: *Ctenopteris celebica* (Bl.) Copel.; *Prosaptia celebica* (Bl.) Tag. & Iwats.

This species is rather unusual among Grammitidaceae by having the stipes conspicuously articulate; they join short, broad phyllopodia.

Polypodium hammatisorum Harr., J. Linn. Soc. Bot. 16: 32. 1877.

Lectotype: Philippines, Luzon, Mt Mahayhay (= Mt Banahaw), June–July 1874, Steere s.n. (MICH).

Currently accepted name: *Crypsinus pyrolifolius* (Goldm.) Copel.

Although collected by Steere "on fallen timber," the usual habitat of this fern is high on small branches and twigs in mid-mountain and mossy forest.

Polypodium steerei Harr., J. Linn. Soc. Bot. 16: 32. 1877.

Microsorium steerei (Harr.) Ching, Bull. Fan Mem. Inst. Biol. Bot. 4: 306. 1933.

Lectotype: Taiwan, Takow (= Kaohsiung), Ape's Hill, Oct. 1873, *Steere s.n.* (MICH).

Currently accepted name: *Microsorium punctatum* (L.) Copel.

Although the name *M. steerei* is accepted in Flora of Taiwan (DeVol et al. 1975), this plant is only an inconsequential form of the wide-ranging and variable *M. punctatum*.

Drymoglossum carnosum var. **obovatum** Harr., J. Linn. Soc. Bot. 16: 33. 1877.

D. subcordatum var. *obovatum* (Harr.) Bak., J. Bot. 28: 267. 1890.

D. obovatum (Harr.) Christ, J. de Bot. 19: 73. 1905.

Lemmaphyllum microphyllum var. *obovatum* (Harr.) C.Chr., Dansk Bot. Arkiv 6(3): 47. 1929.

Lectotype: Taiwan, Tamsui (This was wrongly published as Posia by Harrington. It is evident from the herbarium labels that he interchanged, by error, the localities of var. *obovatum* and var. *subcordatum*, next on the same page), Dec. 1873, *Steere s.n.* (MICH).

Currently accepted name: *Lemmaphyllum microphyllum* Presl.

Christensen (1929, p. 47) cited the type as *Steere 487* (US), but this must be a misinterpretation of a stray number, as none of the ferns bore collection numbers.

Adiantum steerei Harr., J. Linn. Soc. Bot. 16: 34. 1877.

Lectotype: Peru, Dep. Amazonas, Poma Cocha, 1872, *Steere s.n.* (K, chosen by Tryon, Cont. Gray Herb. 194: 176. 1964).

Currently accepted name: *Adiantum ruizianum* Klotzsch.

This is the only case where one cannot really argue for making a MICH specimen the lectotype. Harrington cited two different collections in the original publication, both from northern Peru, one from Poma Cocha and the other from between Moyobamba & Chachopoyas. From between these syntypes, Tryon (1964) chose the Poma Cocha specimen at K and, as the first to choose, he must be followed. There is no Poma Cocha specimen now at MICH, it apparently having been sent off for exchange (Tryon cited isotypes at GH, MO, and US). Three sheets remain at MICH, two from between Moyobamba & Chachapoyas, and one labeled Castia, Peru.

Polypodium xantholepis Harr., J. Linn. Soc. Bot. 16: 36. 1877.

Lectotype: Peru, between San Bartolomeo & San Mateo, Oroya-Linia R.R., March 1873, *Steere s.n.* (MICH).

Currently accepted name: *Polypodium xantholepis*.

This is close to *P. thyssanolepis* A.Br. ex Klotzsch, but is somewhat smaller; the paleae of the lamina below are darker and more strongly clathrate, and the upper surface glabrous.

Polypodium laevigatum var. **rigidum** Harr., J. Linn. Soc. Bot. 16: 36. 1877.

Lectotype: Peru, Dep. Amazonas, Rio Utcubamba, July 1872, *Steere s.n.* (MICH).

Currently accepted name: *Campyloneuron phyllitidis* (L.) Presl.

The lectotype bears the following unpublished habitat data: "Dry places on rocks and branches."

Gymnogramma calomelanos var. **denudata** Harr., J. Linn. Soc. Bot. 16: 37. 1877.

Lectotype: Peru, 1872, *Steere s.n.* (MICH).

Currently accepted name: *Pityrogramma calomelanos* (L.) Link.

Tryon (1962, p. 60) said the "isotype" at K was localized as Pebas, Peru, which Steere visited in Jan. 1872, but that name is not mentioned in the original

publication nor does it appear on the two sheets at MICH. Tryon (1964, p. 68) listed the "type" at K but did not explicitly make it the lectotype.

ACKNOWLEDGMENTS

I am appreciative of the help of Howard Crum (MICH), R. E. Holttum (K), Kenneth Lester Jones (MICH), A. A. Reznicek (MICH), Mary Steere (Ann Arbor), William C. Steere (NY), and Edward G. Voss (MICH).

LITERATURE CITED

- Baker-Blocker, Anita. 1980. Mark Harrington, Michigan's First Meteorologist. *Chronicle, Mag. Hist. Soc. Mich.* 15(4): 35.
- Ching, R. C. 1931. The studies of Chinese Ferns VII. A Revision of the Genus *Tectaria* from China and Sikkime-Himalaya. *Sinensia* 2: 9-36.
- Christensen, C. 1929. Taxonomic Fern-Studies I-II. *Dansk Bot. Arkiv* 6(3): 1-99, index, pl. 1-13.
- Copeland, E. B. 1908. Notes on the Steere Collection of Philippine Ferns. *Philip. J. Sci.* 2C: 405-407.
- . 1936. The Philippine Ferns Collected by J. B. Steere. *Philip. J. Sci.* 60: 19-25.
- Crum, Howard. 1977. William Campbell Steere: An Account of His Life and Work. *The Bryologist* 80: 660-694.
- DeVol, C. E. et al. 1975. *Flora of Taiwan, Vol. I. Pteridophyta and Gymnospermae*. Taipei, 562 pp.
- Gaige, Frederick M. 1932. Joseph Beal Steere—Naturalist, Explorer, Educator. *Mich. Alumnus* 38: 344-353.
- Harrington, M. W. 1875. (Report) To the President of the University. *Proc. Board Regents Univ. Mich.*, October meeting 1875: 476-482.
- . 1877. The Tropical Ferns Collected by Professor Steere in the Years 1870-75. *J. Linn. Soc. Bot.* 16: 25-37.
- Holttum, R. E. 1955. *Ferns of Malaya*. Singapore, 643 pp.
- . 1974a. Studies in the Family Thelypteridaceae V. The genus *Pneumatopteris* Nakai. *Blumea* 21: 293-325.
- . 1974b. Studies in the Family Thelypteridaceae. VI. *Haplodictyum* and *Nannothelypteris*. *Kalikasan* 2: 58-68.
- . 1982. Thelypteridaceae. *Fl. Males.* 11, 1: 331-560.
- Hooker, W. J. & J. G. Baker. 1868. *Synopsis Filicum*. London, 482 pp., t. 1-9.
- Hubbell, T. H. 1964. The University of Michigan Beal-Steere Expedition, 1870-1875. Unpub. MS, 21 pp.
- Jones, Kenneth Lester. 1978. Mark Walrod Harrington (1848-1926): Botanist, Astronomer, Meteorologist . . . *Mich. Academ.* 11: 115-137.
- Kramer, K. U. 1968. The Lindsaeoid Ferns of the Old World II. A Revision of *Tapeinidium*. *Blumea* 15: 545-556.
- Maguire, Bassett, Jr. 1971. Phytotelmata: Biota and Community Structure Determination in Plant-held Waters. *Ann. Rev. Ecol. Syst.* 2: 439-464.
- Mains, E. B. 1956. The Herbarium. The University of Michigan. *An Encyclopedic Survey* 8: 1442-1455.
- McVaugh, R. 1970. Botanical Results of the Michigan Geological Survey under the Direction of Douglass Houghton, 1837-1840. *Mich. Bot.* 9: 213-243.
- Morton, C. V. 1968. The Genera, Subgenera, and Sections of the Hymenophyllaceae. *Cont. U.S. Natl. Herb.* 38: 153-214.
- Price, M. G. 1974a. Overlooked Names of Philippine Ferns. *Kalikasan* 2: 109-113.
- . 1974b. The Pteridophytes Described from Mount Makiling, Luzon. *Philip. Agric.* 57: 37-48.
- Steenis-Kruseman, M.J. van. 1950. *Malaysian Plant Collectors and Collections. Fl. Males I*. Djakarta, 639 pp.
- Steere, J. B. 1879. (Bill of sale) to the Regents of the University of Michigan . . . *Proc. Board Regents Univ. Mich.*, June Meeting 1879: 384.
- . 1938a. A Naturalist Pioneer in South America. Excerpts from Correspondence. . . . *Mich. Alumnus Quart. Rev.* 44: 331-344.
- . 1938b. An American Naturalist in the Far East. Excerpts from Letters. . . . *Mich. Alumnus Quart. Rev.* 45: 47-61.
- Tryon, Rolla. 1962. Taxonomic Fern Notes. II. *Cont. Gray Herb.* 189. 52-76.
- . 1964. The Ferns of Peru. Polypodiaceae (*Dennstaedtieae* to *Oleandreae*). *Cont. Gray Herb.* 194: 1-253.
- Voss, Edward G. 1978. Botanical Beachcombers and Explorers: Pioneers of the 19th Century in the Upper Great Lakes. *Cont. Univ. Mich. Herb.* 13: 1-100.